after a wide *détour* re-crosses east of Hermann, returning to the south-west, thus forming an immense cape-like area of maximum declination to the east of Jefferson City. It is therefore improper to regard the chart referred to as more than a representation of observations then made, although the stations were more numerous than is usually deemed necessary for an area of 60,000 square miles.

The area of minimum declination represented on the chart of April 21 has been more satisfactorily outlined, and a closed area of maximum declination lying to the west has been determined with certainty.

The work of the past summer has therefore increased the complexity of the isogonic lines, and the *gradual* change in declination in passing through these areas of abnormal value shows that the causes must act over areas of from 1000 to 3000 square miles, *i.e.* that the observed effect is not due to minute local causes at the several stations. It will not be possible to determine fully the extent of these abnormal influences until similar work done in adjoining States shall enable a more precise determination of *normal* values. The stations of observation in Missouri now number over 100. Arrangements for the summer of 1882 have already been made, and the survey will be carried forward on a still more extended scale.

FRANCIS E. NIPHER

St. Louis, October 8

THE ECHINOIDS OF THE "CHALLENGER"

ZOOLOGISTS in general, and echinologists in particular, will welcome vol. iii. part 9 of the "Report on the Scientific Results of the Voyage of H.M.S. *Challenger*," which has just been published. It deals with the Echinoidea, and has been prepared by Prof. A. Agassiz, a more competent reporter than whom it would be difficult, if not impossible, to find. We do not propose to do more than give a brief outline of the principal results brought to light in this portly volume, which runs over some three hundred pages of text, and is illustrated by sixty-five plates.

Commencing with a few remarks on classification, Prof. Agassiz passes on to treat at more length of that vexed question of the position of the axis of the Echinoidea. He dissents from the theory put forward by Lovén in his "Études," a memoir which, however much one may differ from it, cannot be read without a feeling of admiration of the "infinite skill"—to quote Prof. Agassiz's happy expression—displayed by the author. Our reporter again asserts the position he has all along held, that, judging from embryological data, the position of the axis is in the main determined by that of the madreporiform plate. Next in order he deals with the structure of the coronal plates, the anal system, the fascioles, and the structure of the spines. In connection with the latter subject Prof. Agassiz takes exception to some views which we have elsewhere put forward as to the systematic value of acanthological characters. His opinions on any point of Echinoid structure merit the highest respect, and so we do not propose to enter here into an examination of his criticism on our work—a criticism, be it said, which is conceived in the true scientific spirit. A more fitting opportunity will offer itself in a further communication on the subject with which we are at present engaged. The reporter then goes on to notice with extreme aversion the attempts to construct "genealogical trees" "which have become so fashionable." In spite of Prof. Agassiz's well-earned reputation, however, one reads with a sort of shudder the assertion that he is about "to show once for all how futile it must be to carry on" these attempts, especially when we remember the men of mark who engage in them. But a genealogical tree is a upas tree to Prof. Agassiz, and he attacks it with hearty good will, albeit we think that the mathematical axe which he wields is by no means so destructive as he appears to believe. That relations exist between the different groups of Echini no one knows better than Prof. Agassiz, and in the next two or three sections of his Report he shows how well he can use his knowledge in the interesting connections he traces between recent and fossil Urchins, and since this relation does exist we cannot see why the attempt to indicate it graphically or descriptively is to be condemned as futile, even though there may be a minimum of 2^{19} possible combinations of variables. Having passed in review the relations between recent and fossil Echinoids the reporter then comes to what is the real sum and centre of his Report, the description of the species and genera, and here we have an abundance of most interesting matter.

The *Challenger* Expedition has added fifty-two new species, comprised in fifteen new genera, to our list of Echinoids, a very considerable addition when we remember that the order is a comparatively small one. The group which has been most largely increased is that of the Echinothuridæ, of which twelve new species have been described, whilst of the Echinometridæ, Clypeastridæ, and Spatangina only previously known forms have been obtained. It would be of course out of the question to notice all the interesting facts brought to light here; the Report itself must be read for this, and we are fain to content ourselves with a few passing remarks on some of the more striking forms. The remarkable genus Asthenosoma, which was established by Grube in 1867 (Calveria, Wyville Thomson, 1869) to contain an Urchin with a flexible test has been increased by the addition of five new species with a very varied bathymetrical range, one having been obtained at 10 fathoms and another at 1400. Wyville Thomson's genus, Phormosoma (1874), has afforded seven new and most interesting species, inhabiting, as a rule, deeper water than its companion genus (255 fathoms to 2600 fathoms). To this genus belongs the honour of furnishing the largest Urchin which Prof. Agassiz has hitherto met with, *Ph. hoplacantha*, Wy. Thoms., measuring 312 mm. in diameter—truly a good-sized specimen. Amongst the Didematidæ we have a remarkable new genus, Aspedodiadema, with the abactinal system and ambulacral plates of a Cidarid combined with the thin test and hollow spines of a Diadema. Micropyga is another hitherto undescribed genus of the same family. Passing over the Echinometridæ (no new species), the Temnopleuridæ (three new species), the Triplechinidæ (one new species), and the Clypeastridæ (no new species), we notice amongst the Petalosticha thirteen new species of the curious genus Pourtalesia (A. Agass., 1869) with its remarkable beaked test; and, amongst other new genera, Cystechinus, which appears to be related to the fossil genera Galerites and Ananchytes. We might go on for a long time noting one interesting form after another, were it not that to do so would make this notice inordinately long. How far further study and discovery will affect the number of genera and species enumerated here it is impossible to say, but as Prof. Agassiz is by no means given to multiplying species, and as most of the specimens appear to have been well preserved—only a few having been described from fragments—it is likely that the greater number will stand. A word in conclusion as to the plates. The majority of them have been drawn by Mr. Roetter, and we congratulate Prof. Agassiz on having at his disposal the services of so gifted a draughtsman. Many of the plates are to our mind very gems of lithographic art. The drawings of the sections of spines, though very pretty, and in most instances handled with great delicacy and finish, do not always give the clearness of detail that could be desired, and the mechanical arrangement both of these plates and of those containing the pedicellariæ and the side views of spines is decidedly objectionable. It may be that Prof. Agassiz and his

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artist have constructed some subtle key whereby they can discover at once the position of any required figure, but it is hidden to our clumsier intellect; and when a plate contains from thirty to fifty-nine figures, numbered apparently without any definite order, the task of picking out any given figure becomes rather tedious. Having said this, however, we have said all that we think we can say against the beautiful plates which accompany Prof. Agassiz' most interesting "Report on the Echinoidea of the *Challenger*." H. W. MACKINTOSH

NOTES

THE anniversary meeting of the Royal Society will be held, as usual, on St. Andrew's Day, the 30th inst. The following is the list of the Council and Officers nominated for election:—President, William Spottiswoode, M.A., D.C.L., LL.D.; Treasurer, John Evans, D.C.L., LL.D.; Secretaries, Prof. George Gabriel Stokes, M.A., D.C.L., LL.D., Prof. Michael Foster, M.A., M.D.; Foreign Secretary, Prof. Alexander William Williamson, Ph.D.; other members of the Council, Francis Maitland Balfour, M.A., I. Lowthian Bell, F.C.S., Sir Risdon Bennett, M.D., Prof. Thomas George Bonney, M.A., Prof. Heinrich Debus, Ph.D., Alexander John Ellis, B.A., Sir John Hawkshaw, M.I.C.E., Thomas Archer Hirst, Ph.D., William Huggins, D.C.L., LL.D., Prof. Thomas Henry Huxley, LL.D., Prof. Joseph Lister, M.D., Prof. Daniel Oliver, F.L.S., Prof. Henry Enfield Roscoe, B.A., LL.D., Warington W. Smyth, M.A., Henry Tibbats Stainton, F.G.S., Edward James Stone, M.A. Prof. Huxley having retired from his office as one of the secretaries, as we intimated last week, Dr. Michael Foster has been named in his stead.

THE Treasury has, it is stated, awarded the late Astronomer-Royal, Sir George Airy, a pension of 1100*l.* per annum, in consideration of his long and valuable services.

MOST of our readers will have heard with regret, and probably surprise, that Prof. Ferrier has been charged with a breach of the Vivisection Act. On the general question our opinion is well known, but into the merits of this particular case we cannot enter so long as the trial is pending.

THE Queen has conferred the honour of Knighthood upon Mr. Erasmus Wilson, President of the Royal College of Surgeons.

THE death is announced of Dr. Bouillaud, the *doyen* of medical science in France, and Member of the Academy of Medicine and Academy of Sciences. He was born at Angoulême in 1796.

THE impending change in the French Cabinet has brought forth an unusual number of regulations from the Minister for Public Instruction. Two of the more notable are the creation at Limoges of a Government school for industrial arts and a general reorganisation of the veterinary schools of Alfort (near Paris), Lyons, and Angoulême.

M. KELLER, who is a Member of the French Senate, has met with an accident in his laboratory. His hand has been severely burnt by an explosion, and he will probably not be able to resume work for a month.

THE experiments at the Paris Opera with the electric light have been successful so far as concerns incandescent light, which is now regularly used. A final decision on the matter will be come to very shortly.

OUR Paris Correspondent writes that the success of the Siemens Electrical Railway has been so great that the Municipal Commission appointed to report on the possible application of electricity will advise the experiment of an elevated railway in some part of Paris. The only objection to the erection of such a line on the Boulevards is its aspect, which it is supposed will not be sufficiently ornamental. A large number of practical suggestions will be made by this Commission.

THE Russian Government has made a grant of 14,000 roubles for next year for two Polar observing stations:—One at the mouth of the Lena, and the other, of second rank, but also for meteorological and magnetic observations, on one of the islands of New Siberia.

THE Corporation of Chesterfield deserves credit for their enterprise; they have decided to dispense with gas entirely as far as public lighting is concerned, and to replace it with the electric light. The lighting will be done by means of about twenty-two Brush "arc" lamps and about seventy Lane-Fox incandescent lamps. Doubtless the example of Chesterfield will soon be followed by other towns.

THE Council of the Society of Arts, on the recommendation of the judges in the late competition of plant labels, are prepared to renew the offer of a Society's silver medal, together with a prize of 5*l.*, which has been placed at their disposal for the purpose by Mr. G. F. Wilson, F.R.S., for the best label for plants. The object of the offer is to obtain a label which may be cheap and durable, and may show legibly whatever is written or printed thereon; the label must be suitable for plants in open border. These considerations will principally govern the award. Specimen labels, bearing a number or motto, and accompanied by a sealed envelope containing the name of the sender, mus be sent in to the secretary of the Society not later than May 1 1882.

THE Royal Commission on Technical Instruction, presided over by Mr. Samuelson, M.P., has begun its work in Paris by visiting the École d'Apprentis in the Boulevard de la Villette, the École d'Horlogerie in the Faubourg du Temple, and those communal schools in which handicrafts are taught. After inspecting the secondary and higher technical schools of Paris the Commissioners will proceed to Chalons, Lyons, Rouen, and some manufacturing towns in the North of France.

AT the ordinary meeting of the Council of the Sanitary Assurance Association, held at the offices, 5, Argyll Place, Regent Street, on Wednesday, October 26, Prof. Hayter Lewis, F.S.A., in the chair, certificates were issued under the Corporate Seal of the Association to those subscribers who had carried out the recommendations of the Association with regard to the sanitary arrangements of their houses. These certificates, which are as yet a new feature in connection with provident householding, are not of less importance than Fire Insurance polices. The certificates are signed by the chief sanitary officer of the Association, Prof. Corfield, M.D., and the surveyor, Mr. Mark H. Judge, and they guarantee the satisfactory condition of the houses to which they refer; the inspection, report, and supervision of the work, where alterations are necessary, being made personally by both officers. The certificates are issued subject to an annual inspection of the property, for which the members are charged a small fee, according to the rateable value of the houses; for instance, for a house rated at 80*l.* the fee is half-a-guinea for each annual inspection, while for a house rated at 200*l.* the fee is two guineas. Detailed reports of works in progress were made, and correspondence thanking the Council for the thoroughness of the reports and supervision of work was read. It is just twelve months since the first meeting of the Association was convened, under the presidency of Sir Joseph Fayrer, K.C.S.I., to form an organisation which should apply the combined sanitary knowledge and experience of medical men, architects, and others by means of specially qualified officers who should yearly inspect the houses of members and report upon their drainage, water supply, and ventilation. The Association was soon after incorporated by special licence of the Board of Trade, by which it is bound to apply the whole of the income and property of the Association solely towards the promotion of its objects, and no dividend or profit can be paid directly or indirectly to the members. The work of the Associa-

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